



THERMOSTATIC DEVICES

NATIONAL REGULATOR CO.
CHICAGO





NATIONAL AUTOMATIC TEMPERATURE REGULATORS

(Patented)

The National Regulator Company manufactures a complete line of Temperature Regulators for controlling hot air, steam or hot water heating systems, hot water tanks, drying ovens, lead kettles, kilns, refrigeration, pasteurization and humidity. This company also manufactures metallic diaphragms and thermostats designed especially for recording gauges, incubators, automobiles, sterilizers, etc., and high and low pressure steam boiler regulators, expansion valves, reducing valves, and hydraulic and electric air compressors.

Catalog G

NATIONAL REGULATOR CO.

FACTORY AND GENERAL OFFICES
208-212 SOUTH JEFFERSON STREET
CHICAGO



OFFICES IN ALL PRINCIPAL CITIES



Federal Reserve Bank Building, Chicago, Ill.

Automatic Temperature Control Is a Present-Day Necessity

THERE are three vital reasons why Automatic Temperature Control should be installed in any building. These reasons are:

1. Economy, through the lowering of fuel cost.
2. Health, due to controlled temperatures.
3. Increased production.

Automatic Temperature Control Saves Fuel

Figures compiled with great accuracy by The National Regulator Co. prove beyond the shadow of a doubt that our apparatus results in a fuel saving as high as 30 per cent. This can be substantiated by tests made by many prominent government, collegiate and mechanical engineers.

For example, a typical office building showed a fuel consumption of $2\frac{1}{2}$ tons of coal per office per year without Automatic Temperature Control. At \$6 per ton, this brought the cost of heating a standard office bay to \$15 per season.

Figures from a large office building under National Control showed a fuel consumption of $1\frac{3}{4}$ tons per office per season, or a cost of \$10.50, a saving of \$4.50 per office per season.

Thus, if the total cost of regulation in a large office building is \$50,000, the saving in fuel, amounting to 30 per cent, or approximately \$7,200 on a total consumption of 4,000 tons of \$6 coal, would be a 15 per cent return on the investment in regulation apparatus per season. This saving is proportionately the same on all classes of buildings.

Think what these figures mean! No other item of office building equipment pays any returns on the investment. Every modern building in order to meet competition installs lavatories, wash-rooms, mail chutes, switches and wall outlets, lockers and other conveniences which pay no return at all. In fact, most of these incur constant operating expense.

Temperature regulation alone actually returns a profit on the invested capital through fuel saving. It also cuts the cost of handling ashes, of firing, and of boiler maintenance and repairs. It reduces water bills through decreased evaporation. In short, it pays a handsome return on the invested capital at every point where time, fuel or materials enter into the cost of heating.

The economy factor alone is important enough to justify the installation of automatic temperature regulation.

Health Is a Big Factor in Temperature Regulation

ANYONE who has worked in an office, a factory, or a warehouse during winter months knows the influence of temperature upon health. Pupils in schools, patients in hospitals and sanitariums, all come under this influence.

If indoor temperatures are hand-controlled, offices, workrooms or schoolrooms may be overheated, with a loss of efficiency and menace to health. If underheated the workers are exposed to various diseases due to improperly maintained temperature.

Large employers of labor know that properly controlled temperatures mean a reduction in time off of employees. Where schoolrooms are evenly heated there is less prevalence of contagious and other diseases.

National Automatic Temperature Regulation maintains a predetermined temperature in every room. It cuts down illnesses among employees, pupils or patients, increases their efficiency, and at the same time pays for itself in the increased economy of fuel.

Temperature Control Increases Industrial Efficiency

Factory superintendents know from long experience that an evenly controlled temperature means increased output, lowered cost per unit as represented in production divided into payroll, and a more smoothly operated plant.

National Apparatus will work wonders toward these ends wherever it is installed. Maximum production cannot be obtained in rooms too warm or too cold.

Not only does National Apparatus increase production, but it always shows a profit on the installation cost in the fuel it saves and in the lowered cost of wages for handling fuel and ashes.

The statements made above are not theory, but are based upon many years' experience in temperature regulation covering practically every class of work.

To install National Apparatus is to promote health, increase efficiency and to reduce fuel bills from 15 to 30 per cent.

When considering these tremendous advantages it will be apparent to any thinking man that temperature regulation is a vital factor in the equipment of any modern building.

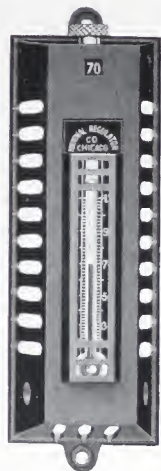
How National Apparatus Solves the Problem of Automatic Temperature Control

WHEN we tell you that Automatic Temperature Control results in such positive savings and benefits as mentioned on the preceding pages, it will be apparent to you that this would not be the case were not National Apparatus correctly designed and properly constructed to accomplish these results.

Some people have an idea that National Apparatus must be complex and intricate. This is far from the case.

Others have an idea that apparatus for the control of temperatures must of necessity be of delicate construction. The facts are that National Apparatus is neither complicated nor delicate. On the contrary, all of our equipment is the simplest in construction that can be designed. It has no auxiliaries and complicated devices. It also is rugged and strong, built to last for many years, and to give service day after day during this period.

Because of this simplicity and ruggedness National Apparatus has been specified by government engineers, municipal engineers and by architects of national reputation for many years.



National
Thermostat
Complete



The National
Thermostat

The National Thermostat

In the National System of Temperature Regulation the control of valves and dampers centers in the thermostat or regulating device. This thermostat is placed in a convenient position on the wall of the room to be controlled. It is a finely made piece of apparatus, sightly and well designed. An accurate thermometer is mounted on the exterior.

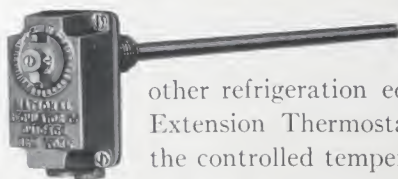
The thermostatic element of vulcanized rubber is extremely sensitive to temperature variations. It contains the simple parts which open and close the leak port of the pneumatic system. Due to its construction the National Thermostat is absolutely dustproof. A simple adjusting knob enables the thermostat to be set for any desired temperature. The materials used in National Thermostat elements are the most durable and sensitive known, insuring long life and continuous operation without maintenance costs.

In considering National Apparatus, bear in mind that it is built in every detail by experienced temperature regulation engineers.

National Thermostats are made in three types: positive, graduated, and reversed action. The National Regulator Company was the *first* to successfully apply *graduated action* to the control of vacuum system. The advantages of this type make it possible to obtain variations of temperature exactly suited to the space to be controlled, with increased economy. This is accomplished by means of a special thermostat which permits just enough air to pass the leak port to hold radiator valve or damper motor partly open, as distinguished from positive type, where valve or damper either is full open or closed, which type is used only in connection with old-fashioned, one-pipe gravity system.

National Extension Type Thermostat

WHERE it is desired to control the temperature of hot air plenum chambers, ducts, kilns, ovens, incubators, cooling rooms, etc., a special National Extension Thermostat is designed. This thermostat is furnished in either positive, graduated or reversed types. It utilizes an expansive element of large area, has extra large air ports and is extremely sensitive.



Extension
Thermostat

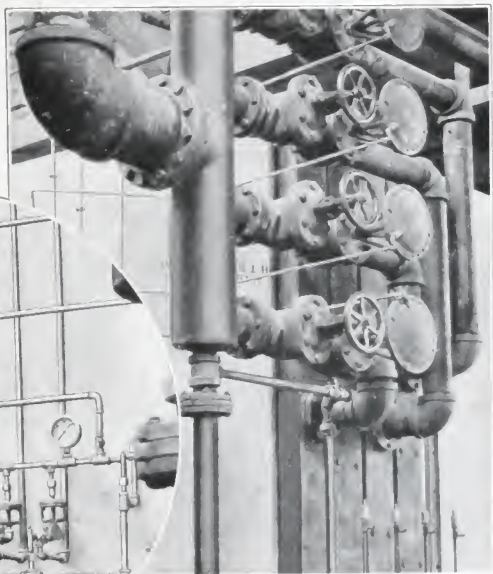
For cooling rooms, refrigerators, brine and ammonia systems, and other refrigeration equipment, the National Reversed Extension Thermostat permits of close regulation of the controlled temperatures.

In ordering regulators of this type, be sure to tell us what they are to control, the temperatures to be maintained, and state whether or not air is available and whether or not the desire is to control a heater or steam coil; if the latter, give size of valve and steam pressure.

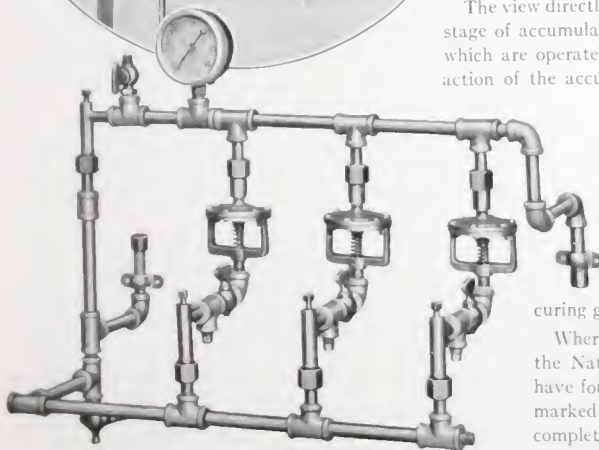
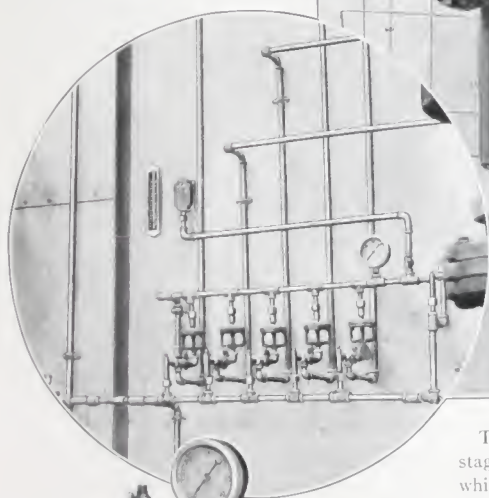
We solicit inquiries from those with temperature control problems involving liquids, various manufacturing processes, refrigeration, etc., and will gladly supply any further information about thermostats of this type upon request.

Makers of Automatic Temperature Regulators

In connection with some forms of heating, particularly blast, it is desirable to have a single thermostat control several banks of heaters or valves, as the case may be. For this type of work we have perfected the National Accumulator, which opens valves at different temperatures. This type of regulation is shown on this page, the illustration at the bottom of the page being the accumulator itself, while the circle shows the installation of the accumulator on the side of duct, adjoining the extension thermostat.



The view directly above shows the final stage of accumulator control, the valves which are operated progressively by the action of the accumulator



The installation of a National accumulator for this class of work will effect a marked economy in pipe connections. It is also an extremely simple method of securing graduated control.

Wherever we have installed the National Accumulator we have found it to function with marked economy and to the complete satisfaction of the purchaser.

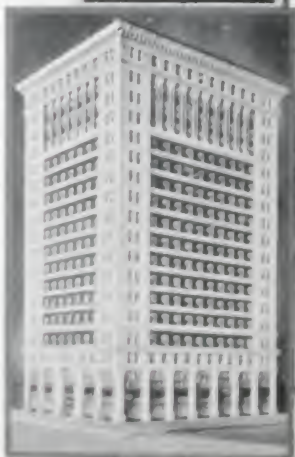


State Capitol
of Utah, Salt
Lake City



High School, Lincoln, Nebr.

Woodmen of the World Bldg.
Omaha, Nebr.



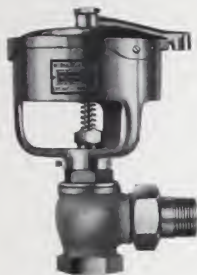
Pacific Mutual Life Bldg.
Los Angeles, Calif.

Junior High School, Cedar Rapids, Iowa



How National Apparatus Controls Direct Radiation

APPPLICATION of thermostatic control to direct radiation involves the use of National Diaphragm operated valves. These are equipped with our famous METAPHRAM or metallic diaphragm units, which operate the valve through fluid pressure or through pneumatic pressure, as the case may be.



Diaphragm Valve

National METAPHRAMS are the original separable metal diaphragms. They excel all other metal diaphragms in their rugged construction, long life and sensitive action. Due to their method of assembly METAPHRAMS afford unlimited travel and power, depending upon the number of sections used.

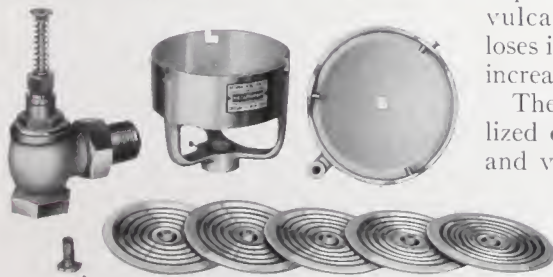
The illustration at the left shows a complete National Diaphragm Valve fitted with METAPHRAMS. At the bottom of this page is shown the valve assembly. Note the simplicity of the entire valve. The removal of one screw in the bayonet joint releases the diaphragm top. Another screw, when removed, releases the entire top for repacking valve or for the renewal of METAPHRAMS in the extremely unlikely event that this should ever be necessary.

The National METAPHRAM-equipped valve is very powerful. Thus, on radiator valves up to 2 inches in size, a 4-inch METAPHRAM provides ample power and lift.

METAPHRAM Valves also are extremely sensitive, responding to temperature variations of but one degree "up or down" through the thermostat with which it is controlled.

Long life is an important feature of National METAPHRAM Valves. The elimination of the old type rubber diaphragms insures this. Rubber is more or less unstable as a diaphragm material, as it vulcanizes rapidly and loses its sensitiveness with increasing age.

These valves may be utilized on steam, hot water and vacuum heating systems, and may be operated either by positive or graduated thermostats.



Valve Top Construction

Metaphram Valves Applied to Indirect Radiation

FOR use in connection with indirect heating systems, tank regulators and high pressure, National METAPHRAM Valves are furnished in several types.

We supply these valves in either angle or globe type, flanged or screwed.

Valve tops, depending upon the size and type of valve, range in size from 4 inches to 10 inches. Valve bodies under 2 inches are supplied in brass: over 2 inches in iron.

Jenkins discs are used on low pressure work. On high pressure installations we furnish either copper discs or double seated valves, according to application and working conditions.

As a precaution in refrigeration and humidity control we supply all of our valves for this class of work reversed and double seated. This insures closing of the valves in all cases of failure of operation.

We wish to emphasize the importance of high quality National Valve equipment for every application, and particularly for extreme heat or high pressure. While we supply rubber diaphragm valves of the very highest quality we recommend National METAPHRAM metal diaphragm valves for their longer life and freedom from repairs or replacements.

It is well to remember that the best temperature control system in the world is at the mercy of the valves which control the heat. No matter how carefully the rest of the system may be installed, and how sensitive the thermostatic equipment, if the valves do not respond quickly and easily to the hydraulic or pneumatic impulse the system as a whole will not function properly. National METAPHRAM Valves are the result of many years of experience in design and construction.



Small Diaphragm
Top, 4-Inch



Large Diaphragm
Top, 10-Inch

How National Metaphram Motors Eliminate Replacement Costs

TO operate dampers or valves controlled by levers so that these may be opened or closed from distant thermostats, National METAPHRAM Motors are employed.

These are sturdy, powerful devices similar in design to National METAPHRAM Valves, but equipped with levers for transmitting the vertical lift of the METAPHRAM sections and increasing or multiplying it for the desired purpose.

National METAPHRAM Motors are operated by air, water or gas pressures. They have a great deal of power for their diameter, due to the use of the METAPHRAM sections employed in their construction.

Just as in the case of the valves used for the control of direct radiation, these motors are a vital part in any system of temperature regulation.



4-Inch Metaphram Motor



Large
Metaphram
Motor

As they often are installed in out-of-the-way places, close to the dampers or lever valves they are to control, it is essential that they be of remarkably long life and be free from expensive replacement costs.

When National METAPHRAM Motors are installed they practically eliminate replacement costs.

Note the clean-cut, business-like appearance of the National Motor. It may be taken apart for inspection in a few seconds, and should repairs ever be necessary the assembly of the motor permits of easy and quick removal of the METAPHRAMS, either wholly or in part.

The illustration at the bottom of this page shows the assembly of a National Motor.

Construction
of National
Metaphram
Motor



The Control of Dampers Through the Use of Metaphram Motors

EVERY heating system utilizes dampers in some form or other, and for the operation of these dampers National METAPHRAM Motors are particularly applicable.

They have the added advantage of being unaffected by high temperatures, enabling them to be used in heated air chambers or ducts, at the side of hot water tanks, and in kilns where an ordinary damper motor would be rendered inoperative.



National
Double Damper

The illustration at the left shows a National METAPHRAM Motor applied to a double damper. These motors are also furnished for end to end, single blade of the louvre type and round dampers such as is shown at the bottom of this page.

National Dampers are made in our own factory, under our closest supervision, and each damper and its motor is given a thorough test before shipment.

We supply these dampers in standard gauges ranging from 14 to 24 gauge steel, but can furnish them of any gauge to meet the most particular requirements.

When selecting dampers for any temperature control installation, be sure that they are National built and METAPHRAM operated — your best assurance of complete satisfaction and long life.

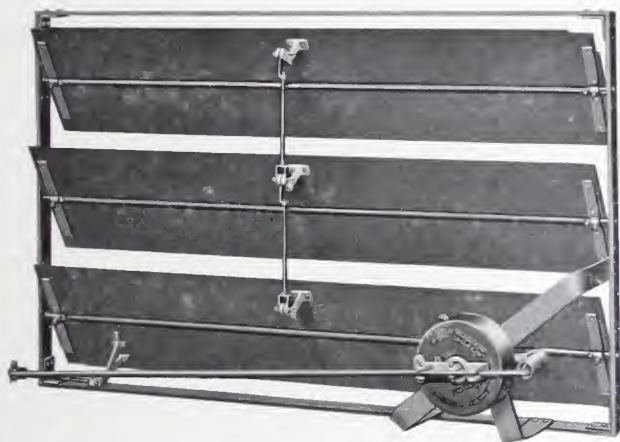


National Round Damper

Makers of Automatic Temperature Regulators

The control of National METAPHRAM Dampers is usually handled by thermostats, and their action may either be positive or graduated. This is an important consideration in connection with damper operation, as some must be "opened full" or closed shut, while others must be designed to remain at intermediate positions.

Owing to the extremely powerful action of the National Motor, a single motor may be used to operate very large dampers such as the louvre type shown on this page.



National Louvre Damper

We want to point out that National Dampers are designed and built by us, and the application of the motor to the work it must do is carefully calculated. We have not adapted a damper to our motor, but rather constructed both to work together to the best possible advantage.

The construction of our dampers throughout is of the very highest quality. On our louvre type each damper vane or blade may be adjusted separately by means of our patented adjustment feature.

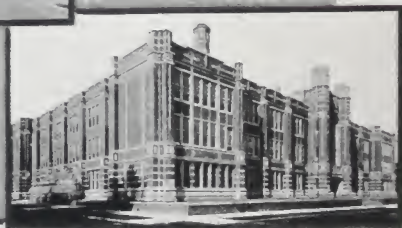
All of our dampers may be operated thermostatically, or controlled by three-way-cocks from distant points, as desired.



Hill Bldg. St. Paul, Minn.



Lincoln Junior High School
Minneapolis, Minn.



High School, Austin, Minn.



Chemistry Building, University
of Minnesota, Minneapolis



Union Station, St. Paul, Minn.

The Automatic Control of Humidity by National Apparatus

MODERN heating and ventilating authorities appreciate the need for proper humidity, and most public buildings are designed to secure it in some manner.

Moisture in some cases is admitted into the heating system through an air washer, or injected directly into the ventilated air, or a steam-heated evaporating coil similar to that shown on the following page is used to increase the moisture content of the air.

Engineers have realized for years that proper humidification reduced the cost of heating through the ability of moistened air to retain heat to a greater degree than the same quantity of dry air.

It has been proved by engineers that an indoor temperature of 65 degrees is more comfortable and healthful, properly humidified, than a dry temperature of 70 degrees. They have shown that the maintenance of proper humidity is a short cut to reduced fuel costs.

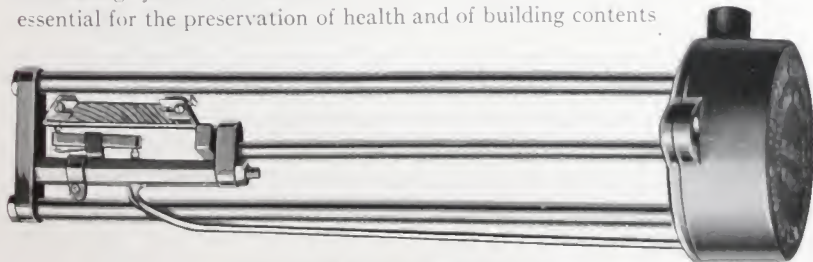


National Humidity
Controller



Humidity Controller
with case removed

*The problem of humidity control has not been an easy one for heating engineers to solve due to the difficulty of introducing the necessary amount of moisture into the heating system of the average building. Where a ventilating system is installed the introduction and control of humidity are essential for the preservation of health and of building contents.



National Insertion Type Humidity Controller

The Importance of Humidity Control

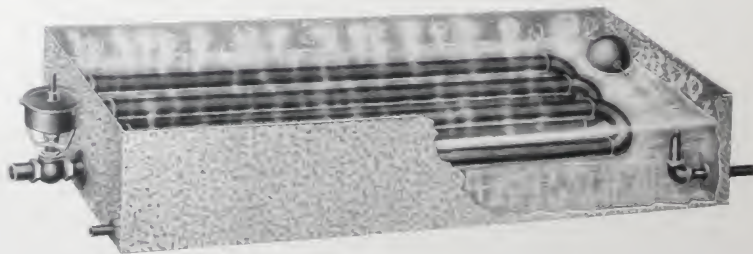
MEDICAL and engineering authorities agree that the accurate control of indoor humidity is essential to proper health. It remained for the National Regulator Co. to perfect apparatus which made this control absolutely automatic.

The National Pneumatic Humidity Controller, illustrated on the preceding page, is affected only by moisture, and not by temperature changes. It is so sensitive that the variation of a few per cent in the relative humidity of a room will cause the controller to increase or decrease the amount of moisture being admitted to the heating system.

You can install National Humidity Control with absolute assurance that it will function exactly right, within very close limits. It will result in a marked reduction in fuel bills, promote better health, and increase industrial efficiency during the winter months.

The National Humidity Controller is made with the same watch-like precision that distinguishes our Temperature Regulation Apparatus. It may be used in ducts, plenum chambers or other out-of-the-way places through the use of the National Insertion Type Humidity Controller.

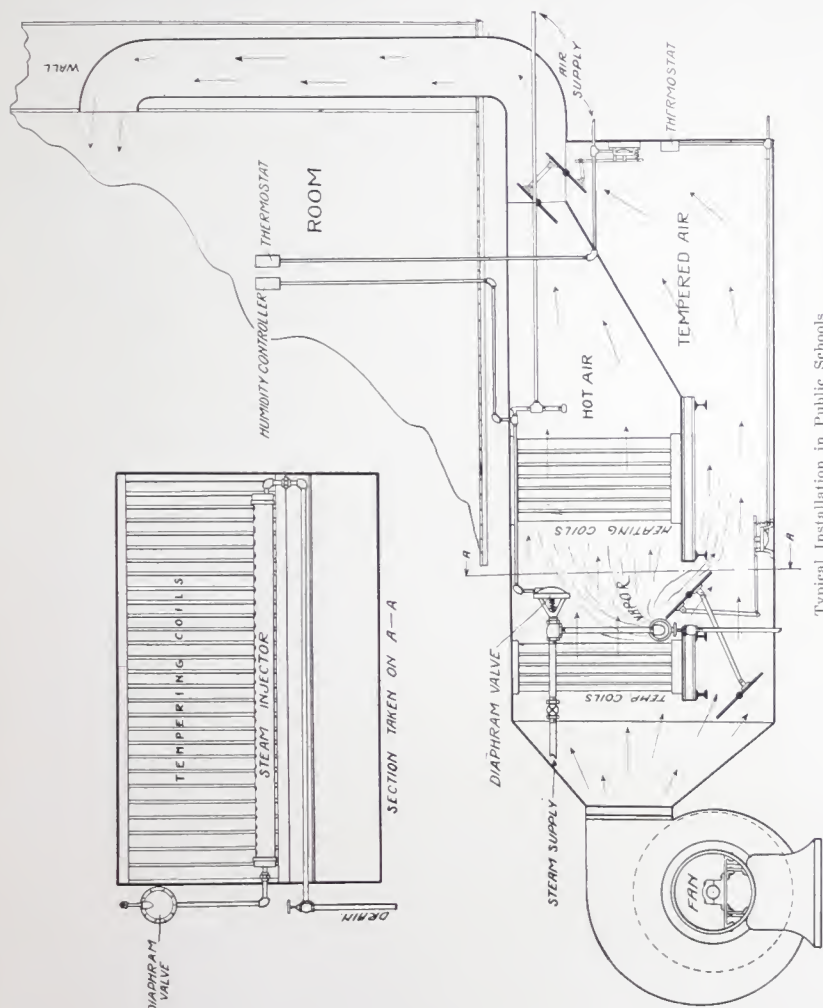
When you specify National Humidity Control Apparatus you select the product of a house known for two decades as the leading manufacturer of quality equipment—an important consideration.



Evaporating Pan Method of Humidifying

Makers of Automatic Temperature Regulators

The illustration below shows diagrammatically the application of a National Humidifying System in a Public School. Note the METAPHRAM Valve applied to the steam supply, the steam being injected directly into the incoming air. Control of this valve is by means of the National Humidity Controller in the room above, the air supply for temperature control being handled by National METAPHRAM operated dampers.



Typical Installation in Public Schools

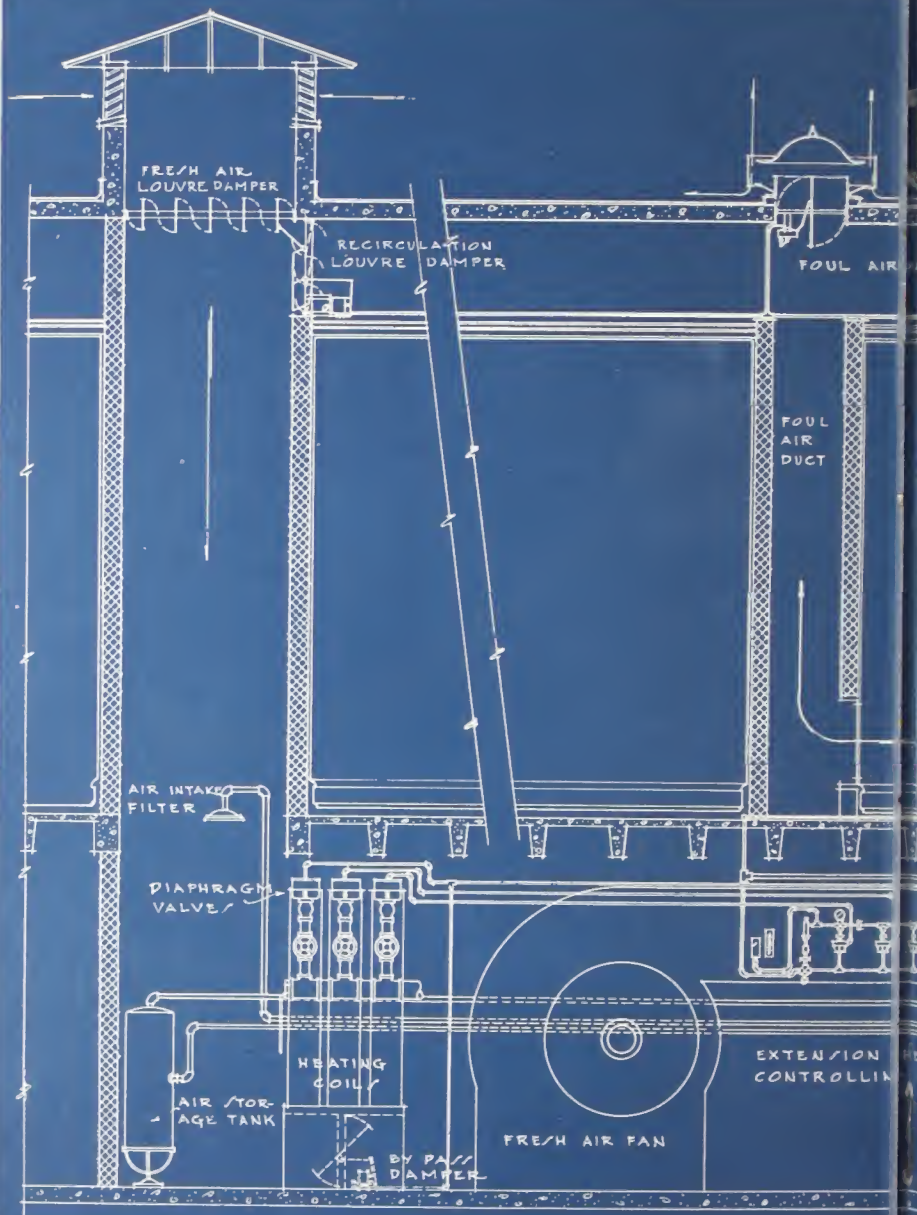
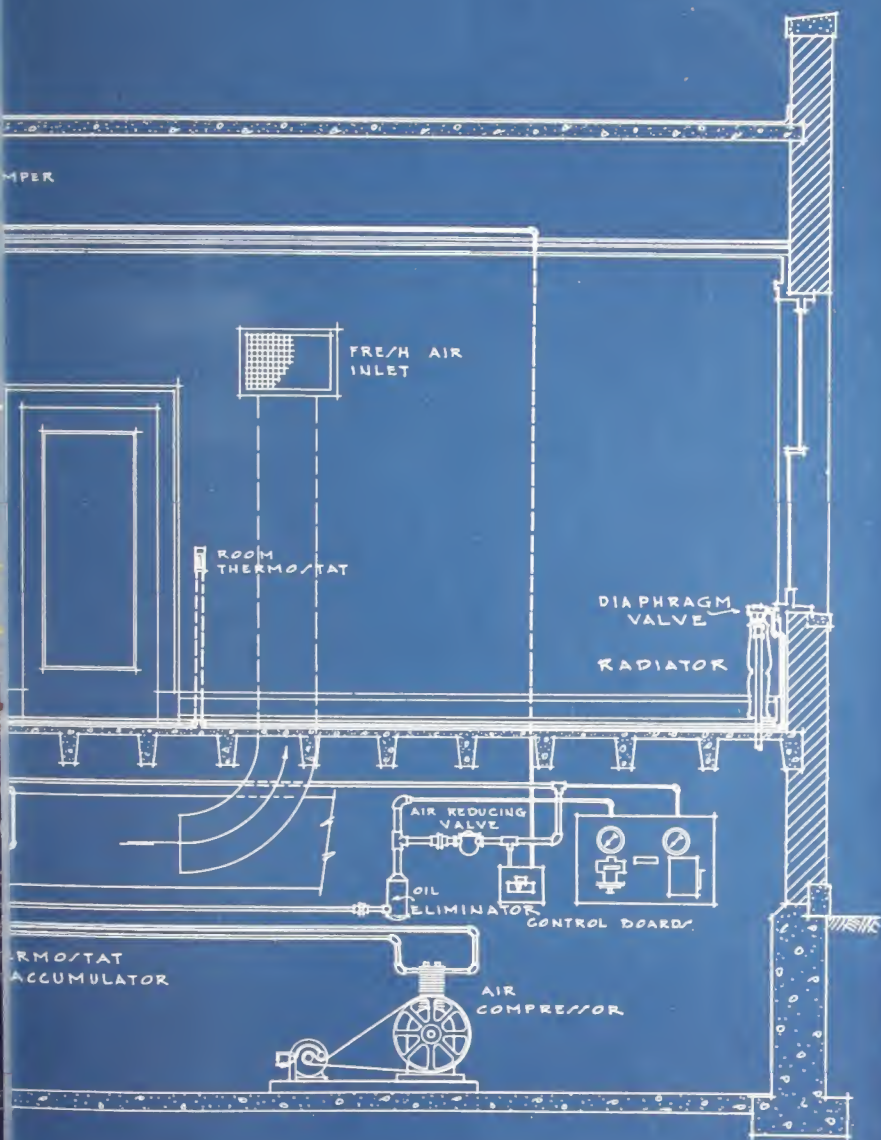


DIAGRAM SHOWING THE APPLICATION
TO A TYPICAL SCHOOL HEATING

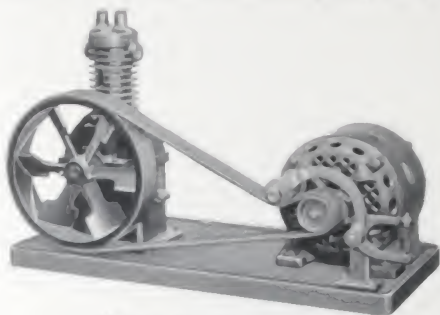


TION OF NATIONAL SYSTEM
VENTILATING LAYOUT.

National Pneumatic Apparatus

WHEN operated pneumatically National Apparatus requires a constant air pressure of 15 pounds.

The ideal method of supply for compressed air is a National Compressor, electrically operated. This, combined with one of our switchboards, gives an automatically controlled supply of air always ready for service.



National Electric Compressor.

Where a high pressure steam line is convenient to the temperature regulating system, we recommend a steam compressor. Our electric compressors are designed to operate at low speed, insuring long life to bearings and all moving parts and freedom from electrical or mechanical trouble. One of our compressors of this type is illustrated on this page. It will be noted that the entire compressor unit is mounted on a cast iron bed plate. The driving belt is kept at the exact degree of tautness required for satisfactory operation by an idler fitted with an adjustment screw and spring tension.

The switchboard, with pressure gauges and automatic switches, is illustrated below. This board is built in our own factory according to the highest engineering standards, and is designed for long-continued service. The board itself is of slate.



National Switchboard

We wish to emphasize the thoroughly efficient design and the superior construction of National Pneumatic Apparatus—a combination which insures highest quality and longest service under all conditions.

Makers of Automatic Temperature Regulators

On small installations, for residences, theatres and similar buildings, we manufacture an extremely compact type of compressor, electrically operated. This is furnished complete with storage tank, motor, compressor and switchboard.



Suction Filter

The floor space occupied by this compressor is approximately 15 inches by 30 inches. The motor is mounted on sliding base for adjustment of belt. Instrument board is provided with well known make of knife switch, gauges and automatic pressure release.



Oil Eliminator

Great care is taken in the manufacture of our compressors and no detail that will make for smooth, continuous operation over a long period of time has been overlooked. All are fitted with oil eliminators, which effectively prevent oil and grease from being circulated through the lines; a suction filter eliminates dirt and dust from the system.

We are prepared to supply estimates, designs and data on air compressors for all types of temperature or humidity control apparatus. Having specialized in the field for many years we are well equipped to give your problems careful attention and to supply apparatus exactly suited to the installation.

A feature of this service which you will appreciate is our engineering advisory counsel which will convince you of the thoroughness with which all of our work is carried out. Write us in detail of your requirements and we shall be very glad to give you the benefit of our experience.

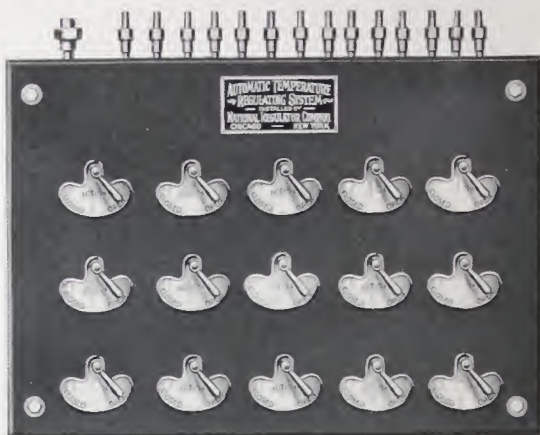


Small National Compressor Unit

Three-way cocks, such as those shown mounted on the National Control Board below, provide a convenient means of remote control for dampers and valves.

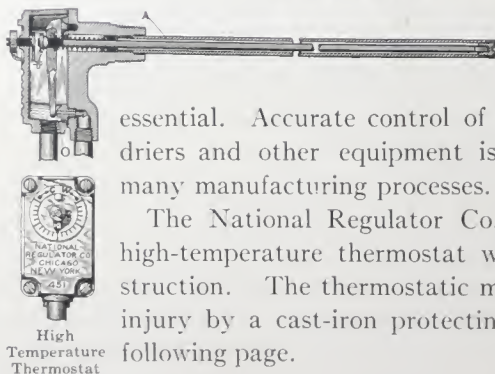
By centralizing these three-way cocks on a single slate board or panel the entire control of the most complicated system of valves or dampers is placed in one convenient location. Each cock is marked with the name of room controlled. Construction throughout is of the very highest type, panel being of slate, metal parts of brass, nickel plated and buffed.

We invite correspondence with those whose temperature control problems are intricate in the extreme, as well as those where the installation is of a simpler character. There is National apparatus designed for every type of job.



Control Board of National System

National Control for Industrial Equipment



High Temperature Thermostat

In the industrial world temperature control is becoming more and more essential. Accurate control of gas-fired kettles, ovens, driers and other equipment is absolutely necessary in many manufacturing processes.

The National Regulator Co. has produced a special high-temperature thermostat which is of all-metal construction. The thermostatic member is protected from injury by a cast-iron protecting well, as shown on the following page.

Makers of Automatic Temperature Regulators

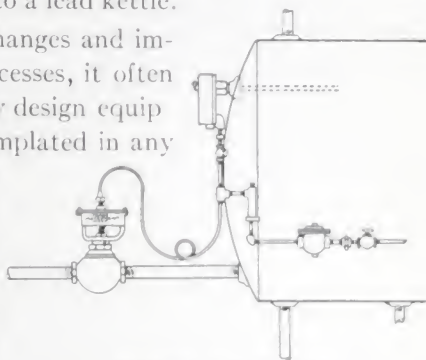


Protecting Well

These high-temperature thermostats are widely used for hot water tanks. They are furnished complete with valve for high or low pressure steam, reducing valve, strainer and tubing. When once installed this equipment is entirely automatic in its operation, works within limits of 2 degrees, and is remarkably long-lived.

The application of such a thermostat to a hot water tank is shown in the line drawing on this page. The lower illustration shows the thermostat applied to a lead kettle.

In these days of constant changes and improvements in industrial processes, it often becomes necessary to specially design equipment for a purpose not contemplated in any standard apparatus on the market. If in your business there should arise a need for a newer or better method of temperature control in manufacturing processes, and if you are at a loss as to how this can



Hot Water Tank Regulator

be accomplished, write us in detail of your problem and we will give you all of the assistance possible in solving it.

Automobile manufacturers, as well as manufacturers of agricultural equipment, have been able to effect tremendous economies in production through heat treatments, special drying ovens, and in other operations requiring close regulation of temperatures. To attempt to cover all of these fields in this catalog obviously is out of the question. We welcome an opportunity to consult with manufacturers on this class of work, to which National Tem-



Thermostat Applied to a Gas Fired Kettle

perature Control Apparatus is admirably adapted.



Riverside High School
Milwaukee, Wisc.



High School
Champaign
Illinois



High School, Pekin, Illinois

Merchants and
Manufacturers
Bank Bldg.
Milwaukee, Wisc.



High School, Marinette, Wisc.



Makers of Automatic Temperature Regulators

For drying ovens such as that shown on this page National high-temperature thermostats are ideal. They are great fuel savers, give temperature regulation that is completely automatic, and secure a much more uniform product than where hand control is used.

On installations of this type, and which are heated by gas, a National gas valve is used. This gives a very uniform temperature control, eliminates wasted fuel, and is practically attention-free, as the operation of the thermostat and valve is entirely automatic.

We invite you to get in touch with our Engineering Department for details of your high-temperature work. We will gladly work with you and supply blue prints and quotations on this class of service.

In the factory of the National Regulator Company we have every



National Control of Oven

equipment for the design and construction of special jobs of the largest size, as well as for the production of small apparatus. Our machinery and tools are of the latest and most up-to-date type, enabling us to effect economies which are reflected in our prices on special work.

Why not let us give you some interesting quotations on work you have projected for your business?



Gas Valve

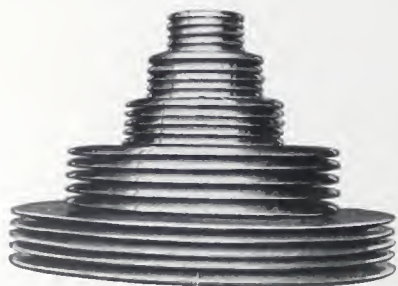
Metaphram Diaphragms— an Exclusive National Feature

THE METAPHRAM separable diaphragm—a product of the National Regulator Co. controlled by letters patent—is one of the greatest advances in diaphragm construction in the entire history of temperature regulation.

The units of a METAPHRAM valve or motor are separable, as shown at the bottom of this page. The sections are assembled into a sturdy, compact unit by means of threaded integral studs.



METAPHRAMS are self-collapsing. They develop maximum of power with minimum of travel per section. Tests up to 750,000 inflations at 15 pounds pressure have failed to reveal the slightest wear of these sturdy sections.



Showing Various Sizes

METAPHRAM diaphragms are made in sizes from 2 to 10 inches in diameter. They are used in valves for direct and indirect radiation control, and in motors for the control of dampers. They also may be applied to gauges, thermometers, ice machines, electric governors and other devices.

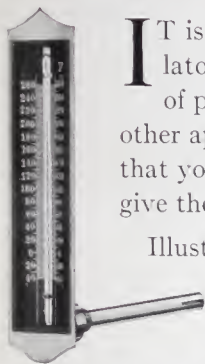
Not all metal diaphragms are METAPHRAMS. There is only one METAPHRAM. The National Regulator Co. are the exclusive manufacturers of this device.

When you install National METAPHRAMS you solve for all time the problem of valve and motor maintenance costs. A fact well worth considering.



Separate METAPHRAM Sections

National Temperature Regulation Supplies and Accessories



Angle
Thermometer

IT is reasonable to expect that the National Regulator Co. should have brought to an unusual degree of perfection its supplies and accessories as well as its other apparatus. This has been the case, with the result that you can secure from us such supplies and fittings as give the greatest satisfaction and longest life.

Illustrated at the left is a National Angle Thermometer of the extension type.

Below, at the right, is a National Reducing Valve. We also make a complete line of expansion valves for condensing coils and gas engines, pressure governors, etc.

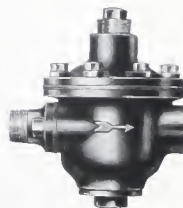
It is suggested that you write us about any supplies or accessories for temperature or humidity regulation, for air compressors of either steam or electric or hydraulic type.

Our Engineering Department is at your service for the purpose of assisting you in planning any type of installation where Automatic Temperature Control is desired. For twenty years the National Regulator Co. has worked with some of the country's largest manufacturers,

builders, railroads and other industries, with a constantly increasing measure of success and with the accumulation of a national prestige in the fields covered by our apparatus.

To submit your problems to us involves no obligation—may prove of incalculable value.

Complete data will be supplied if you will write us in detail as to your requirements, stating what you wish to accomplish in the field of automatic temperature regulation.



Reducing Valve



Dial Thermometer

National Control of High-Pressure Steam Through the A-Jacks

THE National Regulator Co. also manufactures the A-Jacks High-Pressure Steam Damper Regulator.

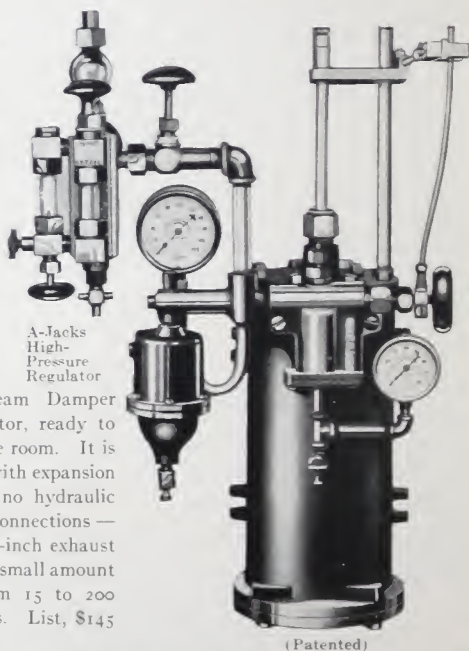
This is one of the best-known and most dependable regulators for high-pressure steam that has ever been developed.

It provides graduated action over a wide range of steam pressures, requires no auxiliaries, and is extremely simple and positive in its action. So sensitive is the A-Jacks that it operates on 1 pound variations in steam pressure.

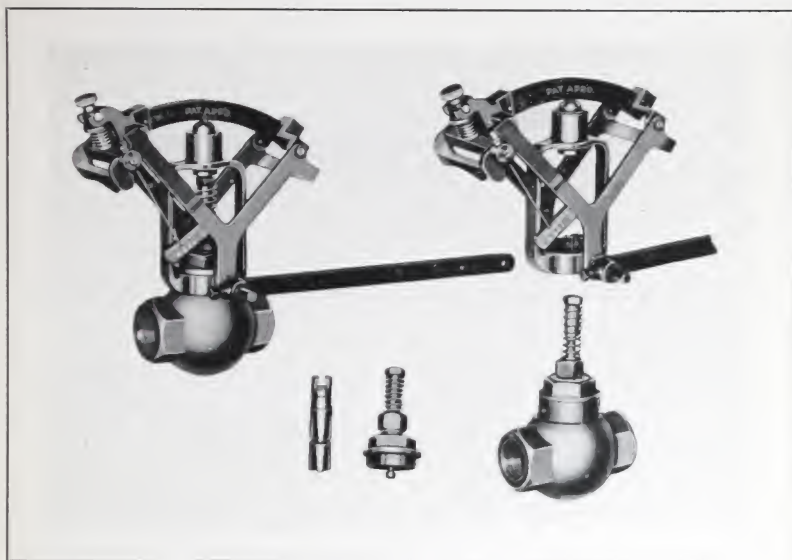
Wherever the A-Jacks has been installed it has effected remarkable economies in fuel, reduced boiler repairs and maintenance costs, and paid for itself many times over within a remarkably short time.

We have prepared a complete special catalog on the A-Jacks, which we shall be very glad to send you on request. It gives complete information about this remarkable damper regulator which you will want to have in handy form for convenient reference.

The A-Jacks High-Pressure Steam Damper Regulator, complete with Compensator, ready to install in any place in boiler or engine room. It is mounted on cast-iron panel provided with expansion bolts for easy mounting. Requires no hydraulic supply or waste lines. Only two connections— $\frac{1}{2}$ -inch dry steam from boiler and $\frac{1}{2}$ -inch exhaust line to sump or ash pit, to take care of small amount of condensation. For pressures from 15 to 200 pounds. Shipping weight, 75 pounds. List, \$145 f. o. b. Chicago.



The phenomenal success of the A-Jacks has won for it the highest commendations of the country's leading engineers—a success which could have been won only by the merit of the regulator itself.



National Cam Valves for Control of Blowers

NATIONAL Engineers have designed a special valve for the control of forced and induced draft blowers as well as for stoker engines where very close gradual control is desired.

These valves permit of complete control of the propelling engine through an ingenious cam which does away with complicated valve ports and mechanism.

These valves are of the globe type, of extra heavy bronze, and are of the piston pattern. Parts subject to wire-drawing are renewable.

Made in sizes from $\frac{1}{2}$ inch to 2 inches. In ordering these valves specify working pressure, and if superheat, the degrees. For working pressures up to 200 pounds.

Write for special catalog fully describing these valves. This special catalog, which also contains complete description of our A-Jacks High Pressure Steam Damper Regulator as well as of our line of low-pressure METAPHRAM regulators, is a book you should have in your files for reference.



Temple Beth El
Detroit, Mich.



Engineering Shops and Laboratories Bldg. University of Mich.



Barbour High School
Detroit, Mich.



John Adams High School
Cleveland, Ohio

High School, Bloomington
Indiana



National Metaphram Low-Pressure Damper Regulators

AN ideal adaption of the National METAPHRAM Diaphragm is found in our low-pressure damper regulators. These are suited for close, accurate damper control of low-pressure, hot water and vapor heating systems, where long life, freedom from maintenance costs and simplicity are desirable.



Type A, Jr.—4-inch

Type A, Jr.—4" is designed for those small, low-pressure house heating boilers which have balanced drafts requiring lifts of less than 3 inches. Operates on ounces from

0 to 15 pounds pressure on any style of low-pressure boiler.

Type A—4" is similar in size to the A-Jr.—4", but has a larger number of METAPHRAM sections, increasing the lift for boilers of larger size. May be used on any low-pressure boiler operating under 15 pounds.



Type A—4-inch

Type B—5½" is a new model, equipped with our special offset fulcrum. This makes it possible to adjust the lift and power of the

lever very easily and quickly. Our B—5½" is best for houses with medium-large boilers.

The small illustration at the right shows in detail the offset or adjustable fulcrum of our B—5½" regulator. By simply changing the position of this fulcrum, after loosening two screws, lift and power of the regulator may be altered.

This adjustable fulcrum is but one of many features which indicate the thought given to every item by the National Regulator Co. Constant improvement has placed our apparatus in the very forefront everywhere.



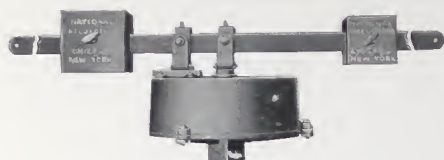
Type B—5½-inch



Fulcrum Detail of Type B—5½-inch

Catalog of the NATIONAL REGULATOR CO.

For medium and large house heating boilers we recommend our Type C—7" regulator. It has great power and considerable lift. It

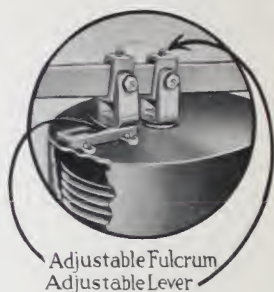


Type BC—7-inch

also possesses an added advantage in our Universal Adjustment feature, which provides an infinite variation of power and lift within the limits of the regulator.

This valuable feature is clearly shown in the small circular illustration at the right, where the simplicity of the adjustment is obvious from a study of the sliding fulcrum.

For large boilers operating on the pressure or vacuum system we recommend our Type D—10" regulator. Having 10-inch sections it is extremely sensitive to slight changes of pressure or vacuum. In addition, its self collapsing METAPHRAM sections make it ideal for vacuum systems.



Adjustable Fulcrum
Adjustable Lever

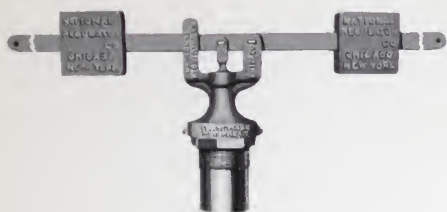
In all low-pressure METAPHRAM regulators the utmost care is taken to insure highest quality of workmanship throughout. This is of the greatest importance in low pressure work, where the regulator must of necessity be extremely sensitive and yet at the same time sturdy enough to give life-time service under domestic conditions of usage where but little knowledge of such apparatus is available on the part of the user.



Type D—10-inch

Every National Low Pressure Regulator is designed right, built with the utmost care and precision, and is of more than sufficient capacity to operate the dampers of the boiler to which it is adapted. Made, sold and guaranteed by the National Regulator Co. The application of National Low Pressure regulators adds to the successful operation of the heating plant, and enhances the prestige of the boiler manufacturer.

Makers of Automatic Temperature Regulators



Type F—2-inch

When we perfected the National Type F—2" damper regulator we solved the problem of damper control for hot water heating plants, hot water boilers, etc. The extreme sensitiveness of the

METAPHRAM insures very close regulation of dampers to within 5 degrees of water temperature change.

We have still further perfected the Type F—2" by the development of our cage assembly of the METAPHRAM sections. These are loosely assembled in a light brass cage attached to the operating plunger. When necessary to remove the sections from the well the entire assembly lifts out as a unit.

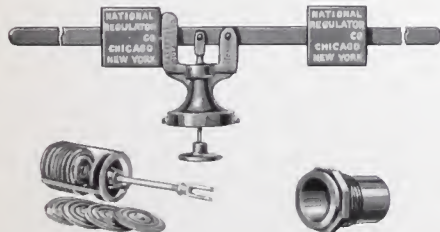
The Type F—2" is a wonderfully efficient regulator for hot water heaters, to which it may be attached in a remarkably short time without the aid of special tools. Like all National products, the Type F—2" and our other low pressure damper regulators are the very acme of simplicity. This is a most important consideration.



Cage Assembly of Type F—2-inch

If you will examine the illustration at the left you will see at a glance how the new cage assembly simplifies the installation and removal of the Type F—2".

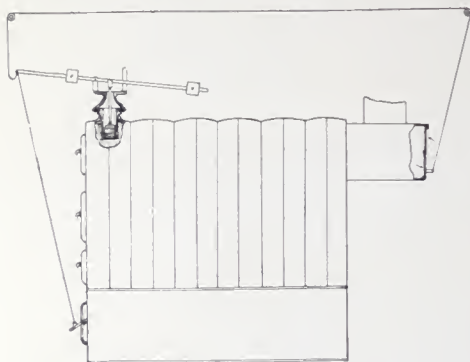
The loosening of two screws permits the lever unit to be removed the cage with its group of METAPHRAMS to be lifted out of the well, and the entire operation takes but a few seconds.



Assembly of Type F—2-inch

Simplicity is almost as important as correct design and long life in low temperature regulator work. National Regulators are remarkably simple.

Installation of Type F—2" Meta-phram Low-Pressure Regulator

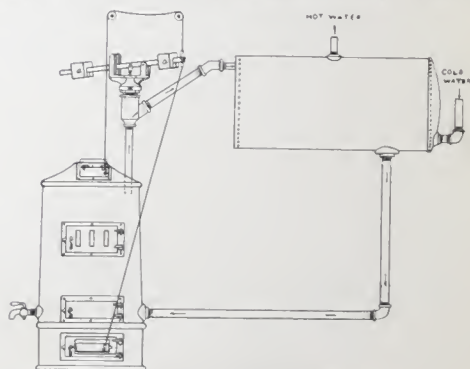


Type F—2-inch. Applied to Domestic Hot Water Boiler

The accompanying illustration shows our Type F Regulator applied to the first section of a domestic hot water heating boiler. Where the boiler is not tapped to receive the 2-inch well, the regulator works just as efficiently and responsively when installed in the flow line.

For domestic hot water heaters the Type F is installed in the flow line by using a Y fitting, as shown below. It is easily adjusted by means of weights on the damper lever, and when once set for the desired temperature, works continuously without any supervision whatever.

SPECIAL BULLETIN ON REQUEST. We have prepared a special Low Pressure Damper Regulator Bulletin which we shall be very glad to send you on request. Ask for METAPHRAM Low-Pressure Damper Regulator Booklet GC.



Type F—2-inch. Applied to Tank Heater

APPRECIATING the impossibility of combining into a single catalog all of the information which individual installations may require, we invite correspondence on our apparatus from those whose problems require the accurate, automatic and complete control of temperatures.



Massachusetts Institute of Technology.
"Boston Tech." Cambridge, Mass.



Lord & Taylor Bldg.
New York City



A Typical School of
New York City

Buffalo Athletic Club
Buffalo, N. Y.



High School
West Seneca, N. Y.



In Conclusion —

May we point out that National Apparatus has been installed in thousands of buildings of the very highest type in practically every state from the Atlantic to the Pacific ?

To illustrate all of these buildings in this catalog obviously is impossible. We shall be glad to furnish a list of our installations and the name of our representative in your locality to show how truly national in scope, in organization, and in character is the application of our apparatus.

While the simplicity of National equipment is such that it may be installed with perfect satisfaction and great economy by any contractor anywhere, subject to our inspection, our organization is complete and is available to undertake installations anywhere in America.

Our guarantee is a positive assurance of a first-class job that will always give the utmost satisfaction and service and result in the greatest economy of maintenance during the long life of our apparatus.

More than 20 years of successful operation in this field is back of National Apparatus and Service.

NATIONAL REGULATOR CO.
CHICAGO



